

Sub 1
GB
an enclosure containing wafer engaging rollers, the wafer engaging rollers being suspended at an angle, the wafer engaging rollers designed to spin a wafer at an angle during preparation.

REMARKS

The Examiner is thanked for the careful review of this application. Claims 17-31 are pending after entry of the present Amendment. Amendments were made to correct typographical errors. Claims 1-16 were cancelled per the issued restriction requirement. New independent claims 28-31 were added. These amendments do not introduce any new matter.

Rejections under 35 U.S.C. § 103:

The Office has rejected claims 17-19 and 22-24 under U.S.C. 103(a), as being unpatentable over Patent Abstract of Japan 63-253627 (Japan '627) in view of either Patent Abstract of Japan 6-196465 (Japan '465), Patent Abstract of Japan 60-245136 (Japan '136), and Patent Abstract of Japan 1-259536 (Japan '536). In a like manner, the Office has rejected claims 21-25 as being unpatentable over the prior art as applied to claims 17 and 23 above, and further in view of European Patent Application 11238713 (EPO '713). The Applicant respectfully traverses the Office's rejections and submit that independent claims 17 and 23 are patentable over the cited references, as none of the cited references would have suggested the claimed invention to one of ordinary skill in the art.

Japan '627 discloses an apparatus for manufacturing semiconductors in which an exposure means is defined in the neighborhood of a plurality of rollers so as to expose a region to be brought into contact with the rollers to light, removing the photoresist material on the flat part. The apparatus of Japan '627 appears to be a base having a slanted top. The wafer is floated on the slanted top as the wafer abuts and sits on three rollers by gravity.

Japan '536 teaches using ultrasonic vibration propagated with a sharp angle to a substrate surface so as to clean foreign contaminative objects adhered to the surface of the substrate while Japan '465 teaches a cleaning device where a semiconductor wafer is chemically treated and cleaned in a plurality of treating chambers that are continuously connected. The cited prior art, Japan '136 discloses a high pressure jet cleaning method and device in which an article to be cleaned is moved between three positions downwardly and upwardly while being cleaned while EPO '713 discloses a scrubbing apparatus for cleaning the

central and circumferential edge part of a wafer. The wafer is held horizontally in the apparatus while the wafer is cleaned.

It is respectfully submitted that no combination of the cited art of record, teach, disclose, or suggest the claimed invention, as defined in independent claims 17 and 23. Japan '627, for instance, does not suggest using an enclosure. A base with a slanted top is not an enclosure. Rather, Japan '627 focuses on removing the entire photoresist on the whole circumference of the wafer by exposing the photoresist to light. In achieving this task, Japan '627 is indifferent as to implementing an enclosure. In fact, as is well known, removing photoresist material generates polymers and contaminants, certain portion of which remains on the wafer surfaces. As such, trying to keep contaminants away from wafer surfaces in such an apparatus using an enclosure, as suggested by Office, would be less than successful, because contaminants and polymers are generated and remain on the wafer surfaces during and after the photoresist removal, respectively.

Additionally, the apparatus of Japan '627 is an apparatus for manufacturing semiconductor devices while claim 17 defines a wafer preparation module and independent claim 23 discloses a spin, rinse, and dry module. It is well known by one having ordinary skill in the art that the semiconductor manufacturing process involves different processes in addition to the semiconductor wafer preparation. For instance, manufacturing taught by Japan '627 is photo resist removal while preparation, as defined in claim 18, involves rinsing, cleaning, drying, scrubbing, and megasonic fluid application. Thus, one having ordinary skill in the art, reading the teachings of Japan '627, would not be motivated to modify the wafer manufacturing apparatus of Japan '627 so as to arrive at a wafer preparation module in which engaging rollers are oriented at an angle, as defined in claim 17.

In a like manner, one having ordinary skill in the art would not have been motivated to modify any of the cited prior art to arrive at a spin, rinse, and dry module that among other features, includes an enclosure with a window which creates a process angle with a horizontal plane, as defined in independent claim 23. Additionally, neither combination of the cited prior art teach or suggest including a pair of drive rollers and an engaging roller configure to respectively spin and engage the wafer such that the wafer being processed creates an angle with the horizontal plane that is substantially equivalent to the process angle, as defined in independent claim 23.

Furthermore, each of Japan '465, '136, '536, and EPO '713 is required to be modified significantly to accommodate implementation of rollers engaging or spinning wafer at an angle

during preparation (claim 17 and 23) or including an enclosure with a window being defined therein at a process angle with the horizontal plane (claim 23). In fact, modifying any of the above-mentioned cited prior art to include rollers to engage the wafer at an angle would require significant restructuring and modification of the remaining components (e.g., ultrasonic vibration of '536, high pressure jet cleaning of Japan '136, etc.) such that such restructuring would not interfere with the objectives and goals of each of the cited prior art. It is submitted that neither one of the cited art discloses or teaches any of such modifications.

Therefore, it is respectfully submitted that independent claims 17 and 23 are patentable under 35 U.S.C. § 103(a) over any combination of the cited prior art. In a like manner, dependent claims 18, 19, 21, 22, 24, and 25 which incorporate each and every element of the respective independent claim 17 and 23 are patentable under 35 U.S.C. § 103(a) over any combination of the cited prior art for at least the same reasons discussed above.

New independent claim 31 is submitted to be patentable over the cited art of record as among other features, independent claim 31 defines a wafer preparation module that includes an enclosure containing wafer engaging rollers in which wafer engaging rollers are being suspended at an angle and the wafer engaging rollers are designed to spin a wafer at an angle during preparation. It is respectfully submitted that the claimed invention, as defined in claim 31, is patentable over the cited art of record.

Indication of Allowability:

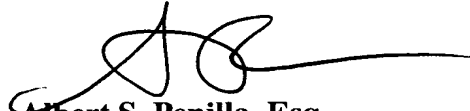
The Applicant acknowledges the Office's comment that dependent claims 20, 26, and 27 would be allowable if rewritten to include all of the limitations of the base claim and any intervening claims. Accordingly, claims 20, 26, and 27 have been re-written in independent form (independent claims 28-30, respectively), including all of the limitations of the respective base claim and the intervening claims. Accordingly, it is submitted that claims 28-30, which define another embodiments of several embodiments defined in the subject application, are in a condition for allowance.

In view of the foregoing, the Applicant respectfully submits that all of the pending claims are in condition for allowance. Accordingly, a Notice of Allowance is respectfully requested. If the Examiner has any questions concerning the present Amendment, the Examiner is kindly requested to contact the undersigned at (408) 749-6903. If any additional fees are due in connection with filing this Amendment, the Commissioner is also authorized

Application Number: 09/823,813

to charge Deposit Account No. 50-0805 (Order No. LAM2P247). A duplicate copy of the transmittal is enclosed for this purpose.

Respectfully submitted,
MARTINE & PENILLA, LLP



Albert S. Penilla, Esq.
Reg. No. 39,487

710 Lakeway Drive, Suite 170
Sunnyvale, CA 94085
Telephone: (408) 749-6900
Customer Number 25920



Application Number: 09/823,813

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Re the application of:

R. Treur

Application No: 09/823,813

Filed: March 30, 2001

For: ANGULAR SPIN, RINSE, AND
DRY MODULE AND METHODS FOR
MAKING AND IMPLEMENTING THE
SAME

)
) Examiner: F. L. Stinson

)
) Group Art Unit: 1746

)
) Date: January 6, 2003

CERTIFICATE OF MAILING

I hereby certify that this correspondence is being deposited with the United States Postal Service as First Class Mail in an envelope addressed to: Commissioner for Patents, Washington, DC 20231 on January 6, 2003.

Signed: 

Courtney F. Yadegar

MARKED UP CLAIMS

24. (Amended) A spin, rinse, and dry module as recited in claim 23, further comprising:

a cleaner dispenser defined within the enclosure, the cleaner dispenser being configured to clean a top surface and a bottom surface of the substrate to be processed[;].

26. (Amended) A spin, rinse, and dry module as recited in claim 23, further comprising:

a plurality of gas blow nozzles defined within an inner wall of the enclosure, at least one [air] gas blow nozzle being configured to dispense a first gas onto each of the drive rollers and the engaging roller[;].

28. (New) A wafer preparation module, comprising:

an enclosure containing wafer engaging rollers, the wafer engaging rollers being oriented at an angle, the wafer engaging rollers designed to spin a wafer at an angle during preparation; and

a nozzle configured to apply a gas flow toward at least one of wafer engaging rollers.

29. (New) A spin, rinse, and dry module comprising:

an enclosure having an outer wall, the outerwall being configured to include a window therein, the window being defined within the outerwall so as to create a process angle with a horizontal plane;

a pair of drive rollers defined within the enclosure, the drive rollers being configured to spin a substrate to be processed while engaging the substrate to be processed;

an engaging roller defined within the enclosure, the engaging roller configured to engage the substrate to be processed, the engaging roller and the pair of drive rollers configured to engage the substrate to be processed such that the substrate to be processed creates an angle with the horizontal plane that is substantially equivalent to the process angle; and

a plurality of gas blow nozzles defined within an inner wall of the enclosure, at least one gas blow nozzle being configured to dispense a first gas onto each of the drive rollers and the engaging roller.

30. (New) A spin, rinse, and dry module comprising:

an enclosure having an outer wall, the outerwall being configured to include a window therein, the window being defined within the outerwall so as to create a process angle with a horizontal plane;

a pair of drive rollers defined within the enclosure, the drive rollers being configured to spin a substrate to be processed while engaging the substrate to be processed;

an engaging roller defined within the enclosure, the engaging roller configured to engage the substrate to be processed, the engaging roller and the pair of drive rollers configured to engage the substrate to be processed such that the substrate to be processed creates an angle with the horizontal plane that is substantially equivalent to the process angle; and

a plurality of holes defined within an inner wall of the enclosure so as to introduce a second gas into the enclosure, the second gas being configured to substantially evenly dry a top surface and a bottom surface of the substrate to be processed.

31. (New) A wafer preparation module, comprising:

an enclosure containing wafer engaging rollers, the wafer engaging rollers being suspended at an angle, the wafer engaging rollers designed to spin a wafer at an angle during preparation.